

Honors Algebra
Test Chapter 4
Form B

Name _____
Solve Brilliantly

Key

I. Solve the following, showing all your work on this paper.
Be sure your answers are easily identifiable.

1. $2(3X - 10) = -4(2X - 3)$
 $6X - 20 = -8X + 12$
 $14X = 32$
 $X = \frac{16}{7}$

2. $|4 - 2X| = 8$
 $+(4 - 2X) = 8 \quad \checkmark \quad -(4 - 2X) = 8$
 $-2X = 4 \quad \checkmark \quad 4 - 2X = -8$
 $X = -2 \quad \checkmark \quad -2X = -12$
 $X = 6$
 $X = \{-2, 6\}$

3. $7 + 3(X - 4) - (5 - X) = 6$
 $7 + 3X - 12 - 5 + X = 6$
 $4X - 10 = 6$
 $4X = 16$
 $X = 4$

4. $(2X + 3)^2 = 81$
 $2X + 3 = \pm 9$
 $2X = 3 \pm 9$
 $X = \frac{3 \pm 9}{2}$
 $X = \{-6, 3\}$

5. $4|X + 5| + 3 = 19$
 $4|X + 5| = 16$
 $|X + 5| = 4$
 $+(X + 5) = 4 \quad \checkmark \quad -(X + 5) = 4$
 $X = -1 \quad \checkmark \quad X + 5 = -4$
 $X = -9$
 $X = \{-1, -9\}$

6. $6(X - 4) - 2X + 3 = 3X + 21 + X$
 $6X - 24 - 2X + 3 = 4X + 21$
 $4X - 21 = 4X + 21$
 $0 = 42$
 $X = \emptyset$

7. $X^2 + 9 = 58$
 $X^2 = 49$
 $X = \pm 7$

8. $|2X - 3| = 7 - X$
 $+(2X - 3) = 7 - X \quad \checkmark \quad -(2X - 3) = 7 - X$
 $3X = 10 \quad \checkmark \quad 2X - 3 = X - 7$
 $X = \frac{10}{3} \quad \checkmark \quad X = -4$
 $X = \{\frac{10}{3}, -4\}$

9. $|X| = -2$
 $X = \emptyset$

10. $5|X + 1| + 3|X + 1| = 24$
 $8|X + 1| = 24$
 $|X + 1| = 3$
 $+(X + 1) = 3 \quad \checkmark \quad -(X + 1) = 3$
 $X = 2 \quad \checkmark \quad X + 1 = -3$
 $X = -4$
 $X = \{2, -4\}$

II. Solve the following for X and Y, showing all your work.

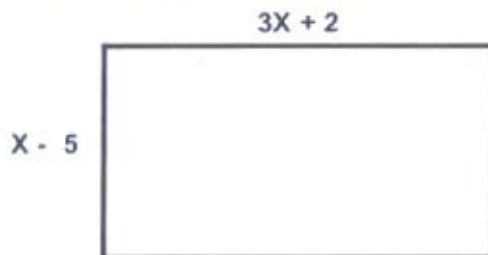
$$\begin{bmatrix} (2X+5) & -5 \\ (Y-8) & 24 \end{bmatrix} * \begin{bmatrix} 4 \\ -2 \end{bmatrix} = \begin{bmatrix} 14 \\ 12Y \end{bmatrix}$$

$$\begin{aligned} 1(2X+5) - 5(-2) &= 14 \\ 2X + 20 + 10 &= 14 \\ 2X + 30 &= 14 \\ 2X &= -16 \\ X &= -8 \end{aligned}$$

$$\begin{aligned} 4(Y-8) + 24(-2) &= 12Y \\ 4Y - 32 - 48 &= 12Y \\ -80 &= 8Y \\ -10 &= Y \end{aligned}$$

$$(-8, -10)$$

III. Refer to the given rectangle.



a. Find the value of X if the perimeter is 74 centimeters.

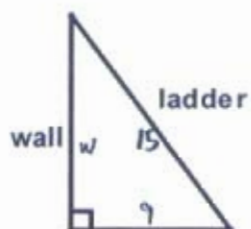
$$\begin{aligned} 2(3X+2) + 2(X-5) &= 74 \\ 6X+4 + 2X-10 &= 74 \\ 8X-6 &= 74 \\ 8X &= 80 \\ X &= 10 \end{aligned}$$

b. Find the area if $X = 8$.

$$\begin{aligned} l(x) &= 3x+2 & w(x) &= x-5 \\ l(8) &= 24+2=26 & w(8) &= 8-5=3 \end{aligned}$$

$$A = (26)(3) = 78 \text{ sq. units}$$

- IV. A fifteen foot ladder touches the ground nine feet from the base of the wall. How high on the wall does the ladder reach?



$$15^2 = w^2 + 9^2$$

$$225 = w^2 + 81$$

$$144 = w^2$$

$$w = 12$$

12 feet up from ground

- V. What is the probability that a number chosen from the set: $\{-3, -1, 0, 1, 3\}$ is a solution to the equation:

$$|X - 4| = |4 - X|$$

1

$$-3 \rightarrow 7 = 7$$

$$-1 \rightarrow 5 = 5$$

$$0 \rightarrow 4 = 4$$

$$1 \rightarrow 3 = 3$$

$$3 \rightarrow 1 = 1$$

- VI. Solve (when necessary) and graph the following:

A. $3X < -12$

$$X < -4$$



B. $|X| > 3$

$$X < -3 \vee X > 3$$



C. $X^2 \leq 16$

$$-4 \leq X \leq 4$$



VII. Set up and solve using algebra (that means equations must be written and solved on this test paper).

- A. Chalky Chip can dip 4 strawberries per minute into chocolate. Sunny Day can dip 6 strawberries per minute into chocolate. Chalky started dipping at 10:00 AM. Sunny started dipping fifteen minutes earlier than Chalky. If they both work continuously (without any breaks), AT WHAT TIME will they finish dipping a total of six-hundred strawberries?

	R	T	D
Chalky Chip	4	X	4X
Sunny Day	6	X+15	6X+90

$$4X + 6X + 90 = 600$$

$$10X = 510$$

$$X = 51$$

$$X + 15 = 66$$

$$\left. \begin{array}{l} 10:00 + 51 \text{ min.} \\ 9:45 + 66 \text{ min.} \end{array} \right\} 10:51 \text{ AM}$$

- B. The speed of a moving van is twenty-five kilometers per hour faster than the speed of a delivery truck. If the van travels the same distance in four hours that the delivery truck travels in six hours, find the speed of each vehicle.

	R	T	D
Moving Van	X+25	4	4X+100
Delivery Truck	X	6	6X

$$6X = 4X + 100$$

$$2X = 100$$

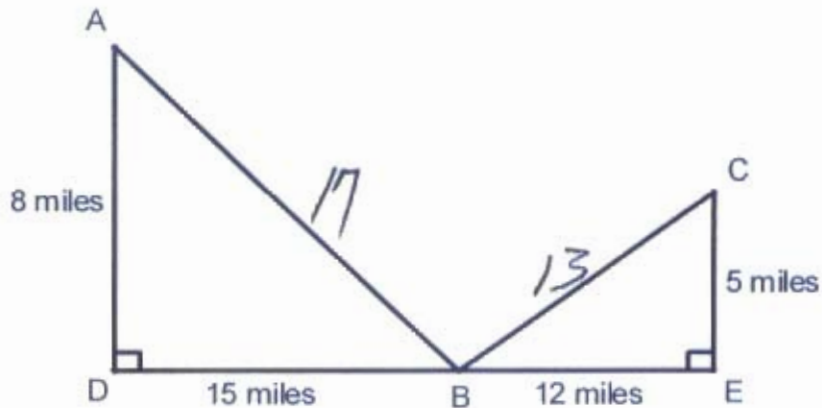
$$X = 50$$

$$X + 25 = 75$$

Van 75 $\frac{\text{km}}{\text{hr}}$

Delivery Truck 50 $\frac{\text{km}}{\text{hr}}$

VIII. Using the diagram below, determine the shortest distance from A to B to C.



$$\begin{aligned} (AB)^2 &= 8^2 + 15^2 \\ &= 64 + 225 \\ &= 289 \end{aligned}$$

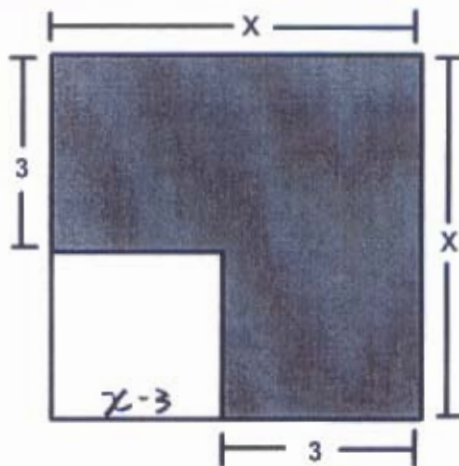
$$AB = 17$$

$$\begin{aligned} (BC)^2 &= 5^2 + 12^2 \\ &= 25 + 144 \\ &= 169 \end{aligned}$$

$$BC = 13$$

$$AB + BC = 30 \text{ miles}$$

IX. The area of the unshaded square is 100 square inches. Write and solve an equation to find the side of the unshaded square, then use the solution of that equation to find the area of the shaded region.



$$(x-3)^2 = 100$$

$$x-3 = \pm 10$$

$$x = 3 \pm 10$$

$$x = 13$$

~~$$x = 7$$~~

$$A_{\text{shaded}} = 13^2 - 10^2$$

$$= 169 - 100$$

$$= 69 \text{ sq. in.}$$

EXTRA CREDIT. Write and solve equations, showing all work.
 No equation, no chance for credit. Partial credit is unlikely.

Kathie flew from Los Angeles to Portland and back again. The speed of the plane from Los Angeles to Portland was 360 miles per hour, and the speed of the plane from Portland to Los Angeles was 315 miles per hour. If the total flying time for the round trip was seven and one-half hours, find the route distance from Los Angeles to Portland.

	R	T	D
To	360	x	$360(x)$
Ret.	315	$7.5 - x$	$315(7.5 - x)$
	$7\frac{1}{2}$		

$$360(x) = 315(7.5 - x)$$

$$360x = 2362.5 - 315x$$

$$675x = 2362.5$$

$$x = 3\frac{1}{2} \text{ hr}$$

$$7\frac{1}{2} - x = 4 \text{ hr}$$

$$d = r + \left\{ \begin{array}{l} 360 \cdot 3\frac{1}{2} \\ 315 \cdot 4 \end{array} \right\}$$

1260
Miles